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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/037,945	01/03/2002	R. Mark Harrison	001.0052 (CE04634N)	7752
29906	7590	10/01/2004	EXAMINER	
INGRASSIA FISHER & LORENZ, P.C. 7150 E. CAMELBACK, STE. 325 SCOTTSDALE, AZ 85251			NGUYEN, DUC M	
			ART UNIT	PAPER NUMBER
			2685	5

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/037,945

Applicant(s)

HARRISON, R. MARK

Examiner

Duc M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,8,10,13,16-20,22,25,27 and 30 is/are rejected.
- 7) ☒ Claim(s) 4,6,7,11,12,14,15,21,23,24,26,28,29,31 and 32 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3-5-02</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

The restriction mailed on 7/15/04 is hereby withdrawn. Claims 1-32 are now pending in the application.

Information Disclosure Statement

1. The references listed in the information disclosure statements submitted on 3/5/02 has been considered by the examiner (see attached PTO-1449).

Claim Objections

2. Claim 1 is objected to because of the following informalities: since "a reference antenna element" is recited in lines 4-5 of the page 22, "a reference antenna element" as recited in lines 10-11 should be changed to "the reference antenna element". Appropriate correction is required.

3. Claim 26 is objected to because of the following informalities:

Claim 26 should depend on claim 23 or 24. Otherwise, the formula for the phase correction factor should include expressions of the formula in the similar way as done in claim 23.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to

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be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 5, 8, 10, 13, 18-20, 22, 25, 27, 30 are rejected under 35

U.S.C. 103(a) as being unpatentable over **Harardt** (US 6,317,586) in view of

Kalliojarvi (US 6,121,927).

Regarding claim 1, **Haardt** discloses a method of transmitting a traffic signal with an adaptive antenna array of a base transceiver such that a subscriber unit utilized a non-dedicated pilot transmitted from a reference antenna element for demodulation of the traffic signal (see Fig. 3), comprising :

- determining a channel impulse response from a plurality of antenna elements in operative communication with the base transceiver to a receive antenna of the subscriber unit (see Fig. 3 and col. 7, lines 4-36);
- computing an array weight vector as a function of the channel impulse response (see col. 8, line 57 – col. 9, line 15);
- transmission the traffic signal with the adaptive antenna weight vector (see Fig. 3 and col. 9, lines 29-31).

However, **Haardt** fails to disclose a reference channel impulse response configured as a reference antenna element is used for channel impulse response estimation. However, in an analogous art, **Kalliojarvi** discloses a method for determine a channel impulse response wherein a reference channel impulse response configured as a reference antenna element for better estimating the

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direction of mobile in a multipath (see Abstract and col. 5, line 45 – col. 6, line 13). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to provide the above teaching of **Kalliojarvi** to **Haardt** for using a reference channel impulse response configured as a reference antenna element for channel impulse response, thereby resulting in computing an array weight vector as claimed, for improving signal connection quality in a multipath propagation because the antenna beam formed the antenna weight vector is directed according to the angle of arrival of the mobile.

Regarding claims **2-3**, the claims are rejected for the same reason as set forth in claim 1 above. In addition, **Kalliojarvi** discloses a channel impulse response determination as claimed (see col. 5, line 45 – col. 6, line 13).

Regarding claim **5**, the claim is rejected for the same reason as set forth in claim 1 above. In addition, since the array weight vector is calculated to maximize the SNR power of a link (see col. 2, line 51 - col. 3, line 23), it is clear that the array weight vector would obviously comprise a function of the traffic signal power as claimed (see col. 3, lines 11-15).

Regarding claim **8**, the claim is rejected for the same reason as set forth in claim 5 above. In addition, since the array weight vector is a complex number which comprises an amplitude component and a phase component, it is clear that the weight vector would obviously comprise a phase correction factor as claimed.

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Regarding claim **10**, the claim is rejected for the same reason as set forth in claim 1 above. In addition, Haardt as modified would disclose a reference antenna is selected as claimed (see Kalliojarvi, col. 5, lines 45-67).

Regarding claim **13**, the claim is rejected for the same reason as set forth in claim 8 above. In addition, by adjusting the array weight vector when transmitting a traffic signal to the mobile, it is clear that a phase correction factor would have been applied to the traffic signal as claimed.

Regarding claim **18**, the claim is rejected for the same reason as set forth in claim 1 above.

Regarding claims **19-20**, the claims are rejected for the same reason as set forth in claims 2-3 above.

Regarding claim **22**, the claim is rejected for the same reason as set forth in claim 5 above.

Regarding claim **25**, the claim is rerejected for the same reason as set forth in claim 8 above.

Regarding claim **27**, the claim is rejected for the same reason as set forth in claim 10 above.

Regarding claim **30**, the claim is rejected for the same reason as set forth in claim 13 above.

6. Claims **16-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Harardt** in view of **Kalliojarvi** and further in view of **Wong** (US 6,233,466).

Regarding claim **16**, **Haardt** as modified would disclose all the claimed limitation except for transmitting an identification of the reference antenna element to the subscriber unit. However, **Wong** discloses a method for adaptive beam forming wherein the estimated optimal beam forming information is determined from a mobile and transmitted back to the base station for utilization (see Abstract). Since the reference antenna element is determined by the base station in **Kalliojarvi**, it would have been obvious to one skilled in the art at the time the invention was made to further incorporate the teaching of transmitting antenna information in **Wong** to **Harardt** and **Kalliojarvi**, for transmitting an identification of the reference antenna element to the subscriber unit as claimed, so that it can be utilized by the mobile (subscriber) unit for demodulation, thereby improving the signal quality of the received signal.

Regarding claim **17**, **Haardt** as modified would disclose all the claimed limitation except for transmitting an identification of the reference antenna element to the base station. However, **Wong** discloses a method for adaptive beam forming wherein the estimated optimal beam forming information is determined from a mobile and transmitted back to the base station for utilization (see Abstract). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to provide the above teaching of **Wong** to **Harardt** and **Kalliojarvi**, for determining and transmitting an identification of the optimal antenna element to base station so that it can be used a reference antenna element for channel impulse response estimation, thereby improving the signal quality connection of the beam forming transmitting signal.

Allowable Subject Matter

7. Claim 4, 6-7, 9, 11-12, 14, 15, 21, 23-24, 28-29, 31-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

As to claims 4, 6, 11, 15, 21, 23, 28, 32, the cited prior art fails to disclose or make it obvious a method or apparatus for transmitting a traffic signal with an adaptive antenna array of a base transceiver such that a subscriber unit utilized a non-dedicated pilot transmitted from a reference antenna element for demodulation of the traffic signal which comprises components and steps as specified in the claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- **Whinnett** (US 6,192,256), Devices for transmitter path weights and methods therefor.
- **Keskitalo et al** (US 6,345,188), Base station for phasing a transmission signal to a mobile unit based on information received from the mobile unit.
- **Fukagawa et al** (US 6,189,913), Directivity control antenna apparatus for shaping the radiation pattern of antenna of base station in mobile

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communication system in accordance with estimated directions or positions of mobile stations with which communication is in progress.

- **Shoki** et al (US 6,087,986), Adaptive array antenna used in multi-carrier wave radio communications.

10. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for formal communications intended for entry)

(for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington VA, Sixth Floor (Receptionist).

Any inquiry concerning this communication or communications from the examiner should be directed to Duc M. Nguyen whose telephone number is (703) 306-4531, Monday-Thursday (9:00 AM - 5:00 PM). Or to Edward Urban (Supervisor) whose telephone number is (703) 305-4385.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Duc M. Nguyen



Sept 4, 2004